



**Topics in Oceanography workshop
April 17, 2015
“Seals and Cape Cod”,
“Seals as Sentinels”**

ONLINE RESOURCES FOR TEACHERS, STUDENTS, CITIZENS

** indicates featured resources

I. Online resources from Woods Hole Oceanographic Institution

**Articles in WHOI’s online and print magazine *Oceanus*

A. About seals

Sand, Seals and Solitude

<http://www.whoi.edu/oceanus/feature/sand--seals--and-solitude>

Return of the Seals

<http://www.whoi.edu/oceanus/feature/the-return-of-the-seals>

Sea Life is Accumulating Pathogens

<http://www.whoi.edu/oceanus/feature/sea-life-is-accumulating-pathogens>

B. About beach closures and bacterial contamination

Testing the Waters and Closing Beaches

<http://www.whoi.edu/oceanus/feature/testing-the-waters-and-closing-beaches>

Shifting Sands and Bacteria on the Beach

<http://www.whoi.edu/oceanus/feature/shifting-sands-and-bacteria-on-the-beach>

The Hunt for Microbial ‘Trojan Horses’

<http://www.whoi.edu/oceanus/feature/the-hunt-for-microbial-trojan-horses>

** Other WHOI online resources

Information on beach closures:

<https://www.whoi.edu/main/topic/beach-closures>

Interactive display on beach closures: <http://www.whoi.edu/home/interactive/beach/>

Multimedia: research on beach contamination by Rebecca Gast’s student Elizabeth Halliday:

<https://www.who.edu/page.do?pid=83576&cl=70456&tid=5122>

News releases on NASRC and on Rebecca Gast's research

<http://www.who.edu/main/news-releases?tid=3622&cid=154169>

<https://www.who.edu/page.do?pid=83576&tid=3622&cid=157449&c=2>

II. Online resources from other sources

A. Seals:

1. Pinniped identification key from U.N. Food and Agriculture Organization
<ftp://ftp.fao.org/docrep/fao/009/t0725e/t0725e33.pdf>

2. links to 2 scientific papers on seals in Massachusetts

**** Great paper on the history of seals and conflict with people ---
pdf: "Seal Bounties in Maine and Massachusetts, 1888 to 1962"**
<http://www.bioone.org/doi/pdf/10.1656/045.016.0206>

**** "The genetics of recolonization: an analysis of the stock structure of grey seals
(Halichoerus grypus) in the northwest Atlantic"**
<http://www.nreresearchpress.com/doi/full/10.1139/z11-012#.VS7VzRc3ut8>

3. links to information for the public

****Northwest Atlantic Seal Research Consortium (NASRC)**
<http://nasrc.who.edu/page.do?pid=116616>

****NASRC Citizen science project: identifying seals**
<http://nasrc.who.edu/citizen-science>

Newspaper articles about the formation of the Northwest Atlantic Seal Research Consortium – quoting our Presenters, Rebecca Gast and Andrea Bogomolni:
The Boston Globe, Dec. 28. 2012:
<http://www.bostonglobe.com/metro/2012/12/28/consortium-begins-deal-with-seal-human-interacting/LTnErAG2roM2d7WuOxFINN/story.html>

The Cape Cod Times, Dec. 21, 2012:
<http://www.capecodtimes.com/article//2012/12/21/NEWS/212210323>

****The Center for Coastal Studies, seal research page**
<http://coastalstudies.org/programs/seal-research/cape-cod-seals/>

4. Harbor seal stock assessment and gray seal stock assessment reports -- background on status and life history of gray and harbor seals:

http://www.nmfs.noaa.gov/pr/sars/2013/ao2013_grayseal-wna.pdf

http://www.nmfs.noaa.gov/pr/sars/2013/ao2013_harborseal-wna.pdf

5. Collection of articles about the effects of ocean changes and climate change on pinnipeds (loss of ice habitat, temperature changes, current changes, changes in prey stocks, lack of food)

- NPR report on this year's record number of beached sea lion pups in California:

<http://www.npr.org/2015/03/20/394242378/record-number-of-starved-sea-lion-pups-straining-calif-resources>

- NOAA Fisheries report on current sea lion mortality in California:

<http://www.nmfs.noaa.gov/pr/health/mmume/californiasealions2013.htm>

- article about a British Antarctic Survey report on seals in Antarctic:

<http://www.sciencedaily.com/releases/2014/07/140723131407.htm>

- from The Climate Institute:

<http://www.climate.org/topics/ecosystems/seals-battle-climatechange.html>

- 2014 American Association for the Advancement of Science (AAAS) article on the effect of Arctic climate change and ice loss on seals and whales:

<http://www.aaas.org/news/arctics-big-thaw-may-affect-health-whales-seals>

- 2014 article in The Guardian on effects of Arctic warming on walrus:

<http://www.theguardian.com/environment/2014/oct/03/walrus-alaska-beach-climate-change-arctic-ice>

6. Seals are predators – Seals are Prey

A scientific study by Netherlands researchers, identifying grey seals as major predators on harbor porpoises, using forensics and DNA:

<http://rspb.royalsocietypublishing.org/content/282/1798/20142429>

2014 Journal article: "Feeding by grey seals on endangered stocks of Atlantic cod and white hake" – says that where cod and hake are aggregated they can be a significant part of seals' diet, but also saying that there aren't enough samples to allow identification of seal diets throughout their ranges and over a year.

<http://icesjms.oxfordjournals.org/content/early/2014/07/20/icesjms.fsu123.full>

** A page on the NASRC (Northwest Atlantic Seal Research Consortium) web pages on seals and human fisheries:

<http://nasrc.who.edu/research/fisheries-issues>

A 2011 report from Fisheries and Oceans, Canada – on Historical Grey Seal Abundance and Changes in the Abundance of Grey Seal Predators in the Northwest Atlantic

<http://www.dfo-mpo.gc.ca/Library/344127.pdf>

2012 You Tube video of great white shark attacking grey seal off Chatham, Cape Cod, MA:

<https://www.youtube.com/watch?v=RklCujfMdyM>

** From Northwest Atlantic Seal Research Consortium (NASRC) website: article about the relationship between great white sharks and seals off Cape Cod -- “Gray Seals and Great Whites: Not Black and White” by Elizabeth Bradford, April 2013 –

<http://nasrc.who.edu/research/sharks>

B. Bacterial contamination of beaches:

NRDC guide to water quality at vacation beaches

<http://www.nrdc.org/water/oceans/ttw/>

Environmental Protection Agency, beach monitoring program

<http://www.epa.gov/region1/eco/beaches/>

EPA pages on U.S. beaches

<http://www2.epa.gov/beaches>

EPA’s Q&A page on beach monitoring

<http://www.epa.gov/region1/eco/beaches/qa.html>

Public policy and beaches - 2013 article from Duke University’s Nicholas Institute for Environmental Policy Solutions: “Pollution Controls Increase Beach Attendance, Study Shows”

http://nicholasinstitute.duke.edu/articles/pollution-controls-increase-beach-attendance-study-shows#.VS_VBhc3ut9

Mass. Department of Public Health, Beach water quality site

http://mass.digitalhealthdepartment.com/public_21/index.cfm

Rhode Island Beach closure data

<http://www.health.ri.gov/data/beaches/>